



HIGHLIGHTS OF GROUNDBREAKING included the traditional shovel ceremony (left to right): Livermore Mayor Dale Turner, Vice President Dick Claassen (8000), Livermore Chamber president Sue Dell'Acqua, and Alameda County

Supervisor Ed Campbell. Speakers were (clockwise from upper left) Maj. Gen. William Hoover, Major Gen. Ken Withers, Executive Vice-President Tom Cook (20) and DOE/AL manager Ray Romatowski.

Grounding Ceremonies at Livermore

Hoover: 'Results We Have Not Yet Dreamed Of'

Speaking at the April 10 groundbreaking for Sandia's new Weapons Engineering Laboratory building, DOE Assistant Secretary for Defense Programs Maj. Gen. William Hoover said, "This building is really in recognition of the important contributions Sandia Livermore has already made to the nation — not just in a national security sense, but in the many spinoffs that come out of the work associated with the activities here.

"Buildings are buildings, but they house people and equipment, and people respond well to being in a pleasant environment," he continued. "I can guarantee you that there will be results we have not yet dreamed of, even in our wildest imaginations, that will come about because somebody who is in this building will have an idea, and to some degree that idea is going to be stimulated by the pleasant environment and the high tech equipment we are going to make available. This will attract new people to Sandia Livermore, and that's important because that's where again new ideas can come from. . . ."

Vice-President Dick Claassen (8000) served as emcee and welcomed the crowd of some 200 to the ceremonies held just south of Bldg. 911 where the new 77,000 square-foot, three-story facility will be built. He explained that the schedule calls for construction to be completed in late 1986 and the building occupied by August 1987. Some 70 percent of the space will be light laboratories, with the other 30 percent offices, conference rooms, and support space. Much of the space will be used to consolidate electronics activities currently scattered around the site; the building will also include physics labs.



Executive Vice-President (and former SLL vice-president) Tom Cook said the building has been planned for some 17 years and has undergone many iterations over that time, "having been located in at least 10 places on site." He explained the biggest cost-saving feature of the structure is that it is patterned after several already built in Albuquerque. "To you gentlemen who support this at DOE, Sandia will work hard to ensure that we will have significant payoffs to the weapons program from your investment in us," he concluded.

Director of Military Application Maj. Gen. Ken Withers said, "This is an important milestone for DOE's nuclear weapons program to be getting a modern laboratory in which we can consolidate the research and development work associated mostly with electronics There is reason for joy for the many people who will be moving out of trailers into this new building."

Also speaking was DOE Albuquerque Operations Office Manager Ray Romatowski, who noted, "With people like Bill Hoover and Ken Withers in Washington we hope to continue this kind of construction program for future projects." He praised the perseverance of those who pursued funding for the project through the years and predicted that this effort would be well re-

warded.

Other special guests included Richard Du Val, manager of the DOE San Francisco Operations Office; Roger Batzel, director of LLNL; Ed Campbell, Alameda County First District supervisor; Dale Turner, mayor of Livermore; Sue Dell'Acqua, president of the Livermore Chamber of Commerce; Garland Bryan of the Flatow, Moore & Bryan architectural firm; and Jerry Harr and Carl Fregian of F & H Construction Co., general contractors for the \$20.4 million project.

A traditional shovel groundbreaking ceremony followed the speeches.

**Aprilfest
'85
Special Section
Inside**

Antojitos

F-lying High with Hyphens Hyphenation is, of course, an inexact science. The experts often disagree on whether a pair of words that are often seen together have established a close enough relationship that they should be perceived as engaged, and therefore hyphenated in public. (The next step, if they really become intimate, is to join them in holy typelock, like this — no hyphen, no space.)

But the hyphenated words I wish to concentrate upon today are those that show up at the ends of lines in typeset columns. Time was when the skillful Linotype operator would ensure that, if a word had to be split to fit the margins, it would be split in an appropriate place — that is, between syllables. However, the ubiquity of the computerized typesetting device has spawned a new phenomenon — words split wherever the computer decides. And its decision is apparently based on a decided paucity of information about proper word splits.

I first noticed the phenomenon in late 1983. The *Journal* wrote "who-opee" for "whoopee"; I was mildly amused. Since then I've found "F-lying" and "fireb-rand" in the *Journal*; "intert-wined" (a good word to describe the serving of a sherry between main courses) and "homeg-rown" in the *Tribune*; and "rob-bed" (to describe the theft of your Posturpedic, I assume) and "chie-fly" (probably the head of a local Dipteran organization) in one or the other paper. My amusement has turned to fascination: how can they do that to their readers? Won't the doubletakes they're causing lead to lawsuits based on twisted necks, even whiplash, as readers hit one of these, then swivel back to re-read it — "What was that again?" Then, recently, as *LAB NEWS* let one slip through ("ear-nings" — little nings you wear in your ears, like earrings, I think), I've hoped our readers were sufficiently inured to the physical dangers involved.

I've saved a couple of my favorites: "sea-led" is one. Ah, yes, "I must go down to the seas again, to the lonely sea and the sky" — surely poet John Masefield would have known what "sea-led" meant. But the most intriguing example of word splits is this one: "wome-n" from the *Journal*. It may not be an interesting new coinage, but it's certainly intriguing: how did they have room on the line for the hyphen but not for the "n"? * * *

Sometimes We Cheat We received a tumultuous outburst of acclaim for our special issue on fusion two weeks ago — in fact, we planned a "thank you" party for those who wrote us, but one was ill and the other didn't want to go out alone. So although the *LAB NEWS* writers and photographers would really like to take full credit for the whole affair, justice demands that we recognize publicly the writing effort by Nigel Hey and Ken Frazier of our sister Public Information Division, who contributed significantly to the stories we published. ●BH

Welcome

Albuquerque

Merlinda Cordova (2832)

John Noe (2614)

Illinois

David Kuntz (1633)

Indiana

Mark Heying (5238)

New Jersey

Sandra Shipp (1126)

George Schuh (1111)

New Mexico

Donald Small (2314)

New York

Gregory Homicz (1636)

Ohio

William Stewart (5266)

Kirtland Hosts Guard, Reserve Appreciation Day

Sandians who are members of the National Guard or Reservist programs are invited to participate in a Guard and Reserve Appreciation Day hosted by Kirtland Air Force Base on May 15 as part of Armed Forces Week activities.

"Sandia has traditionally supported its employees who serve their country by participating in the National Guard and Reservist programs. On the occasion of the upcoming KAFB Appreciation Day, I'm proud to reaffirm that support," says President George Dacey.

The highlight of the day will be a luncheon at the East Officers' Club beginning at 11:30 a.m. The guest speaker will be Dennis Shaw, Principal Deputy Assistant Secretary of Defense for Reserve Affairs.

Sandia members of the Reservists and Guard and their supervisors are encouraged to attend the luncheon. Frank Martinez (3163) has so far identified 55 members of the National Guard and the Reserve who are Sandia employees. Please contact Frank (6-1689) if you are a member of either organization and have not received an invitation to the luncheon (\$5 each).



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VP ART DAVIE (3000) and retired Sandian Dean Irvin (left) review statement of support for Sandia employees who are members of the National Guard and Reservist programs. Irvin is chairman of the New Mexico State Committee for Employer Support of the Guard and Reserve.



MOST MOBILE EMPLOYEE at Sandia is probably Jim Smith (8024) — he's spent his entire 27-year career at both Albuquerque and Livermore in mobile or temporary offices. He was in a barracks at SNLA from 1958-64, then in Mobile Office 3 and later 4 at SNLL. He's standing in front of the latter as it was being moved to make way for the new Weapons Engineering Lab. He's now located in another mobile office, but once the new Lab is complete, Jim expects to move into a real building — 912.



EXPLAINING THE COMBUSTION BOMB experiment to Alameda County Supervisor Ed Campbell (left) is Dennis Siebers (8362). He is showing the sapphire window used in the single cylinder engine to study spray combustion in a diesel motor. The supervisor received a briefing on Sandia and toured the combustion Research Facility recently.



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TWO MOST RECENT SANDIA LIVERMORE retirees are Bert Barker (8274) and Harry Olson (8183), at right.

Take Note

Sandia work experience student Colette Clark was recently awarded a \$500 scholarship from the California Scholarship Federation Seymour Memorial Award Committee. A senior at Livermore High School, Colette works with Norm Breazeal (8478) in the development of strategic threat and engagement models.

Several LLNL employees have teamed up musically to produce a record album (also a tape version) to help raise money to fight Cystic Fibrosis. The 16-year-old drummer in the group, Charlie Stockley, is a victim of CF and the son of Chuck Stockley (8181). The album, called *God's Miracle*, can be obtained for a donation of \$8 or more at St. Bartholomew's Church in Livermore.

Emily Joiner (8025) wrote an article published in *Personnel* magazine's October 1984 issue. Her subject was "Erosion of the Employment-at-Will Doctrine."

Sympathy

To Dick Jones (8445) on the death of his mother April 16 in Livermore.

Multidisciplinary Effort

New Small-Grained Ceramics Permit High-Field Varistors

Ceramic variable resistors — varistors — can now regulate voltages more than 100 times greater than has been possible in the past. The key to the advance is a new sub-micron-grained ceramic developed by a multidisciplinary Sandia project team.

Varistors commonly serve as "lightning valve blocks" to protect power transmission lines from overvoltages caused by lightning strikes. Varistors also protect TV sets and other home appliances from surges in the electrical power supply by diverting the excess energy harmlessly to ground.

Sandia's new varistors operate at much higher voltages than do home appliances — voltages common to weapon components, for instance.

As might be expected of a ceramic device, varistors behave like insulators at low voltages: they allow only small amounts of electrical current to flow through them. In some ways they're like the spillway in a dam. Small amounts of water normally flow through water tunnels in the dam, but when enough water rises against the dam, instead of breaking down the structure it surges over the spillway. In the same way, when the voltage applied to a circuit containing a varistor exceeds a certain value (the varistor's switching voltage), the excess energy is tapped off through the varistor and harmlessly sent to ground.

"The key to the new high-field varistors is our ability to engineer ceramic microstructures," says Bruce Tuttle of Ceramic Components Development Division 2531, team leader for the project. "We've shown that by varying certain processing conditions like temperature, reaction time, and proportions of materials used, we can control a ceramic's grain size. That in turn allows us to tailor its electrical character."

The smaller a varistor's grain size, the higher its switching voltage. That's because smaller grains have more grain boundaries (the regions between grains that act as the variable resistors in a varistor.) Because electrons have trouble crossing the boundaries at lower voltages, more boundaries in a given volume mean a higher switching voltage.

Based on that knowledge, Bruce, Cliff Ballard (his supervisor), and Gordon Pike (1815) began more than two years ago discussing the possibilities of making a truly high-field varistor ceramic. Gordon's theoretical calculations led to the conclusion that achieving a consistent 0.4 to 0.5 micron grain size would be the key to the advance. (A micron is about 4/10,000ths of an inch.)

The process for making the small-grained varistor material was developed by Bob Dosch (DMTS, 1843), with assistance from Bob Brooks (2533). The process differs considerably from the conventional method, which relies on mechanical mixing of oxide powders and on high-temperature sintering. Instead, Bob and Bob use chemical precipitation and ion exchange

techniques to make very fine, highly reactive zinc-manganese-cobalt-bismuth powders that are then sintered (heated enough to weld the powders together but not melt them) at a relatively low temperature, producing a ceramic with submicron-sized grains. Unlike the other fabrication processes, this one has the advantage of reproducibility.

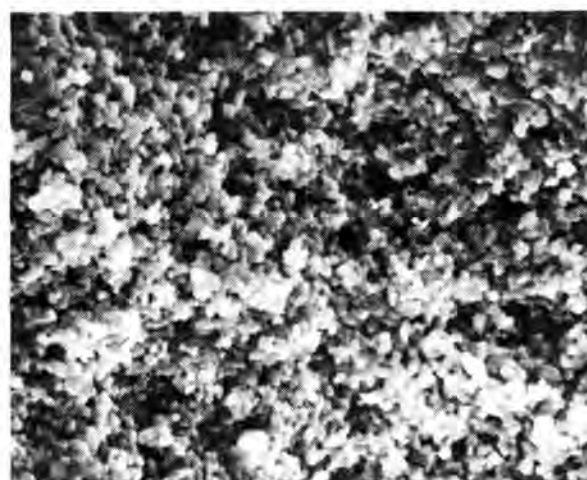
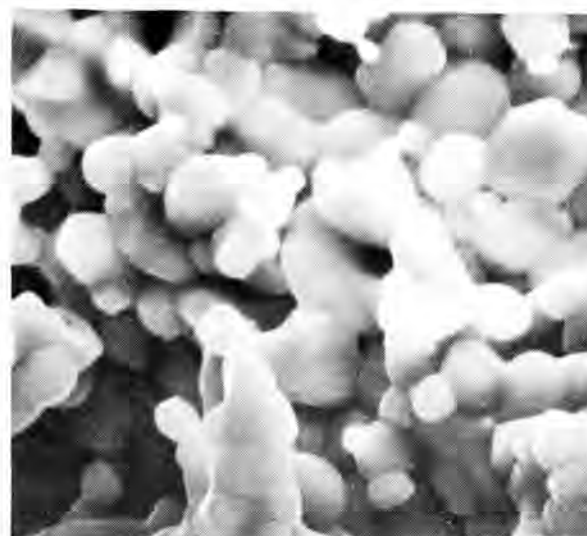
The result is a very uniform powder mixture with grains of a predetermined shape and size. Grain size is controlled by the exact time and stoichiometry (quantitative relationship between the substances used) of the precipitation reaction. The highest density, highest switching field varistors require powders that have a grain size of 0.1 micron or less and a narrow range of grain sizes.

The new ceramic material can have switching voltages ranging from 20 to 100 kilovolts per centimeter of material. (Most commercially available varistors have switching voltages in the 0.5 to 5 kV/cm range.)

"This research has been a cooperative effort involving ceramists, chemists, physicists, and component engineers," says Cliff. "It is significant, not only for varistor development, but for the entire field of ceramic engineering and science."

"Very high-field varistors will permit size reductions and new capabilities for many Sandia device designs. And their usefulness probably will spill over into the commercial sector," Cliff continues. "A major chemical company, for example, has recently expressed an interest in licensing our new varistor."

"However, I believe that the real accomplishment here is our ability to analyze the factors that control electro-ceramic performance and then to use that knowledge to design new micro-architectures required to



SCANNING ELECTRON MICROGRAPH shows two varistor surfaces magnified about 2700 times. Top photo is low-field varistor made with conventional mixed oxide processing; typical grain size is about 30 microns. Lower photo is new high-field varistor made with chemically prepared powders; typical grain size is 0.5 micron.

meet specific technological needs. This capability will have long-term significance in this field."

Current effort in the project is to scale up the process from the 200-gram batches used in the initial development work to the production of kilogram quantities. This work is being done by Tim Gardner (7476) with the goal of maintaining the same stringent quality control that ensures the same uniformity as in small batches.



SAMPLE of newly developed high-field varistor material, which can regulate voltages up to 100 times greater than possible in the past, is held by Bruce Tuttle (2531). Dark portion of sample is a zinc oxide varistor slug; silver dots are electrodes used in testing the material. Process for making the ceramic material was developed by Bob Dosch (DMTS, 1843), right, and Bob Brooks (2533).

Powell Sees Exciting Future

When mechanical engineer Ray Powell left Union Carbide for Los Alamos in 1944 to help the Manhattan Engineering District solve a metallurgical problem with uranium tetrafluoride, he expected to return in six months.

Now, more than 40 years later, he's retired from Sandia. He was a vice-president in administration for 26 years; that's longer than anyone else has ever held a Small Staff position.

Ray helped to shape Sandia into the national asset it is today. He also played a key role in integrating Sandia Albuquerque into the community of which it's a part. And he has some exciting goals for retirement.

Those kinds of achievements were far down the road when young Ray decided to stay on at Los Alamos when his engineering task was done. It was a heady time and place for an engineer. Ray recalls the "supercharged atmosphere as efforts were being made to complete the weapon."

After the war, Norris Bradbury became director of Los Alamos. He asked Ray to set up a college recruiting program to replace some of the staff people who were heading back to universities or industry. That task put Ray into personnel work.

And when Los Alamos's Z Division (from which sprang Sandia) was transferred to Albuquerque in 1947, Bob Henderson, the division director (and later a Sandia VP), asked Ray to come along and set up a personnel group. "I welcomed the opportunity," says Ray. "I was ready for the big city." (Albuquerque had all of 45,000 people at the time; Sandia had 200-300 employees.)

Relations with Russia had soured by then, so Ray remembers a Sandia operated under crude conditions and with very limited equipment, but driven by the compulsion to get nuclear weapons into stockpile.

Then, in 1949, Sandia became a subsidiary of the Bell System (now AT&T). The adjustment from University of California to Western Electric management, policies, benefits, and procedures "was somewhat painful," recalls Ray. "It [University of California management] was a bit casual, and the approach that George Landry [the first president] brought was a bit severe for an R&D lab. But it was also rather necessary. And in a few years, just the right balance was established under Don Quarles and Jim McRae. [Quarles was president in 52-53, McRae in 53-58.] Today I believe that our greatest asset is our corporate sponsorship."

Ray came into Sandia as a member of the administrative staff, was promoted to division supervisor and, five months later, to department manager in 1950, to director in 1954, and to VP in 1959.

As Ray looks back, he's proud of several accomplishments. One is his suggestion during President Julius Molnar's (1958-60) second Large Staff planning session that Sandia "raise its sights in the recruiting of staff both in level of degree and level of academic achievement." Shortly thereafter, Sandia was recruiting staff people with advanced degrees and high grade point averages.

"And it's because of the high quality of our staff that our mission has expanded over the years," Ray believes.

Another accomplishment he assisted in was to integrate Sandia into the Albuquerque community. "We were once isolated philosophically because of the nature of our work and isolated geographically as well," Ray points out. "Many of our employees were housed on the Base; the Coronado Club was their social center. The city resented us a bit — we were hiring their best people away from them, but we weren't spending our money downtown.

"I was involved with the decision to close Base housing. That meant that our people just naturally became part of the community. And later many of us became active members of community activities. Little by little Sandia became a highly valued member of the community.

That cause was helped along by the formation of the Employee Contribution Plan, which complements the city's United Way campaign. Conceived by Ted Sherwin, who headed Sandia's public relations group under Ray for many years, ECP was (and still is) an important part of Sandia's commitment to the community.

"I also take pride in having had a hand in our Equal Employment Opportunity/Affirmative Action program," Ray notes. "We've consciously sought out some very talented people from New Mexico, and they've made real contributions through the years. I think that wouldn't have happened if we — Bob Garcia and the others in Personnel — hadn't really worked at making it happen. Thanks to efforts like that, Sandia enjoys a good reputation in the community at large."

Ray also feels good about the current spate of construction going on at the Labs. Although former vice-president Dick Bice did the initial planning for the improvement of Sandia's physical plant, Ray inherited the task when Dick retired. Ray is proud of his Plant Engineering group's role in upgrading Sandia's facilities.

"Yes, I've been party to some mistakes too," he says. "The major one is that I and some other members of Small Staff did not prevail in maintaining the diversification of programs begun under Monk Schwartz and headed by former vice-president Glenn Fowler. We abandoned that direction, so when the turndown in the nuclear weapons business occurred in the late 60s and early 70s, we had to reduce our staff drastically — about 25 percent over three years. If we had continued the planned diversification of the Labs, the impact of the nuclear weapons reduction would have been less painful.

"Sandia has now recovered fully. That's to a large extent because Morgan Sparks and George Dacey have been able to accomplish the goal that President Molnar set so many years ago — that Sandia become a truly national asset."

To Ray, both of the recent presidents embody the kind of management style Ray preaches. That style means putting together a good team, then delegating authority and responsibility and staying out of the way while the work gets done. It also means an openness with the employees —



(drawing by Jim Walston, 3155)

not only determining the basic policies necessary to the Labs but also explaining the rationale underlying the policies. "Such a style is very important to the health of the laboratories," notes Ray.

As Ray left Sandia, he was excited about two things. One was, of course, the announcement of his candidacy for governor; his years of serving state and local officials as the head of a variety of task forces have, he hopes, given him the background he needs to be a major contender in the elective political arena.

And, as he gave a capsule history of the labs, he was excited about Sandia's prospects: "As we developed our technical capabilities in the early days, we began to be called upon to do other things. That began the diversification process. The projects we accepted were selected very carefully: they had to be important, they had to have a future, and they had to use the capabilities we had already developed. As a result, our work in energy, for example, developed a very good synergism with our work in weapons — new technology developed in the weapons area sometimes paid off in the energy area and vice versa. This kind of synergism is now being extended to conventional weapons in a very effective way, just as former executive vice-president Jack Howard envisioned. And Sandia may indeed become a key player in the new SDI program.

"To be a key player in the adequate defense of this nation, to be a key player in making certain that we have a continuing adequate energy supply, and to be in the process of developing new scientific understanding and technical know-how that can be used by this country to maintain its military and economic strength — all of that is just kind of mind boggling. I think everyone at Sandia should feel they are a part of a vital organization.

"Personally, I feel more enthusiastic and confident about the future of Sandia than I have at any time in the past 40 years. It's a good time to be leaving."

Sandia Galileo Project Completed

A unique electronics order — delivery to the Jet Propulsion Laboratory (JPL) of more than 10,000 radiation-resistant silicon chips for the Project Galileo flight to Jupiter — is virtually completed by Sandia.

The chips — microprocessors, memories, and custom integrated circuits (ICs) — represent a major portion of the electronics that will be used in the National Aeronautics and Space Administration project, which is scheduled for launch from a space shuttle in May 1986.

All of these chips, which Sandia began supplying in 1981, have been specially made to operate in the severe radiation environment that the spacecraft will encounter first during its 390-million-mile, two-year trip, and then after it reaches Jupiter's atmosphere.

As the spacecraft nears Jupiter, it will deploy a probe that will venture deep into the planet's atmosphere, possibly even below the lowest water cloud layers. The spacecraft, meanwhile, will orbit Jupiter at least 11 times during a 20-month period.

Without the chips, this ambitious space mission would not be possible.

Radiation hardening, a process perfected during the past 15 years at Sandia, involves fabricating components in extremely clean surroundings and chemically and physically altering their electronic structure so that the degrading effects of radiation on the chips are slowed.

"The Sandia devices provided to JPL must function perfectly because they are the heart of systems that will measure, correlate, analyze, and transmit data about the surface and atmosphere of Jupiter and its satellites," says Bob Gregory, director of Microelectronics 2100.

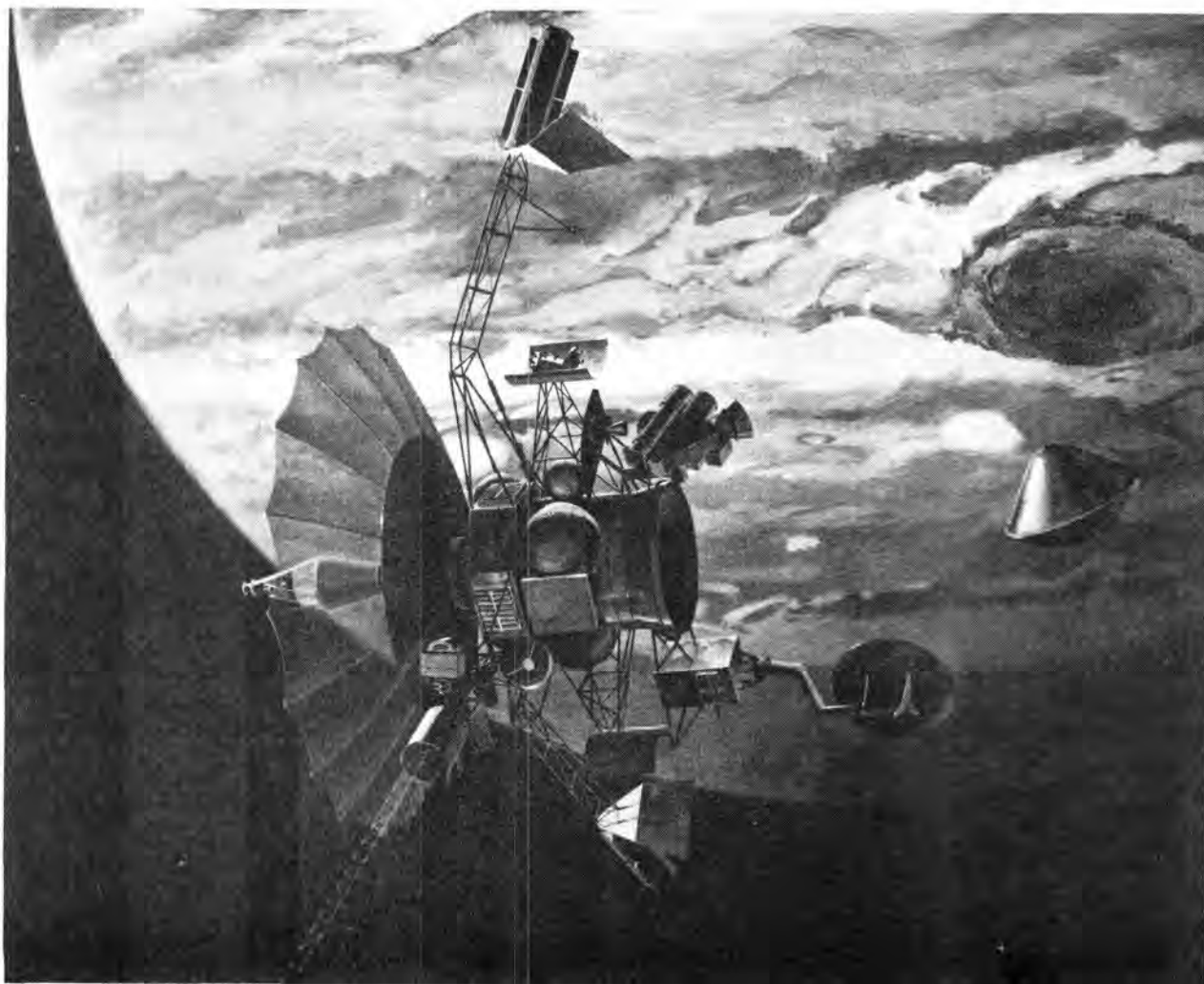
All of the Sandia chips that will be used on the Galileo spacecraft have to withstand a total dose exposure of 50,000 rads of radiation. (A rad is a unit of radiation energy absorption. A dose of about 1000 rads is typically fatal to humans.)

In addition, some of the more modern chips — with smaller transistors and interconnections than earlier designs — required a last-minute additional measure of protection against the effects of being hit by high-energy oxygen or sulfur ions (present in Jupiter's atmosphere) and cosmic rays (which could be encountered during the spacecraft's trip to the giant planet).

When a high-energy particle or a cosmic ray passes directly through a transistor located on one of these chips, it suffers a voltage surge that scrambles binary digital information (1s become 0s, and vice versa). This causes temporary memory loss, called single event upset (SEU). Older-generation microelectronics, which do not have as many transistors in a given space, are not as sensitive to this phenomenon.

"The potential for SEU has always been present," says Keith Treece (2115). "In fact, it's logical to assume that high-energy particles or cosmic rays have passed through other spacecraft. We didn't see any effect, though, because the resulting voltage surge was not sufficient to upset the device.

"However, as device feature sizes and



DRAWING shows the Galileo spacecraft releasing its probe as it nears the surface of Jupiter. To be launched in May 1986 from the Space Shuttle, Galileo will require two years to travel the 390 million miles to the giant red planet where it will make 11 orbits gathering and relaying information from Jupiter and its moons. Sandia's radiation-hardened microelectronics make the mission possible.



PROJECT TEAM that designed radiation-hardened microelectronics for the Galileo program displays one of final wafers fabricated. The wafer contains ICs immune to "single event upsets," a scrambling of binary memory, from impacts of cosmic rays or the high-energy oxygen or sulfur ions present in Jupiter's atmosphere. From left are Al Giddings, Frank Hewlett, and Ken Treece (all 2115).

the amount of energy required to operate a transistor decreased, we reached a point where virtually any commercially available IC with memory circuits was susceptible to SEU."

After detailed analysis of Voyager and Pioneer data, Galileo project leaders determined that the more advanced chips planned primarily for the spacecraft's attitude control system (and a few other places on both the spacecraft and probe) would be unacceptably vulnerable to SEU, even with additional physical shielding. The attitude control system must ensure that the spacecraft antennae face the earth so that it can send and receive messages.

As a result, in mid-1983, scientists and engineers at Sandia's Center for Radiation-

hardened Microelectronics (CRM) began to develop a set of brand new SEU-immune devices that would be functional, physical, and electrical replicas of the original parts.

Project Galileo director John Casani says, "Sandia's work in this area solved a problem that was absolutely crucial to the success of the mission. SEU was not well understood early in the project. Sandia's quick solution to the problem avoided the necessity to develop a new computer for the spacecraft at a very late date."

Treece, Al Giddings and Frank Hewlett, all of the Labs' Microprocessors and Memories Division 2115, spearheaded the effort to replace the original attitude control system electronics with SEU-immune chips.

Aprilfest Successful



NATO GROUP WITNESSED 40-mph crash of Army truck propelled by rockets into vehicle barrier.



AND EXAMINED the results afterward.

'A Real Milestone, A Watershed' for NATO Groups

Some 100 members of two NATO (North Atlantic Treaty Organization) groups, most of them Europeans, spent time at Sandia last week for briefings on, and demonstrations of, the Sandia programs related to weapon safety, security, and survivability. Belgium, Canada, Denmark, Federal Republic of Germany, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Turkey, the United Kingdom, and the U.S. were represented at what Sandia dubbed Aprilfest (that is, sequel to Octoberfest, a session similar to Aprilfest that Sandia hosted for U.S. officials in the fall of 1978).

clear Planning Group, which is composed of the Secretaries/Ministers of Defense of the member nations. The NPG has formed the two groups to address aspects of the NATO nuclear stockpile. One is the High Level Group, chaired by Richard Perle, Assistant Secretary of Defense for International Policy. The HLG is concerned primarily with political and policy issues.

The second is the Senior Level Weapon Protection Group, chaired by Richard Wagner, Assistant to the Secretary of Defense for Atomic Energy and Chairman of the Military Liaison Committee. The SLWPG is concerned with technical and military issues and concentrates on the security and survivability of nuclear weapons sited in the member nations. Most members of both groups are highly placed in their home governments.

Created in 1977, the HLG committee is responsible for "seeking ways to respond to the growth of Soviet intermediate nuclear forces in Europe and, more recently, of improving the survivability of NATO forces that will remain in Europe after the total number of tactical nuclear weapons there was reduced by 1400," according to Perle. It is the HLG that recommended the "two-track decision" — simultaneously deploying cruise missiles and Pershing IIs in

Europe and negotiating with the Soviets with the hope of obviating the deployment by reaching an agreement. The NPG asked the HLG to recommend any adjustments to NATO's nuclear stockpile that might grow out of the decision to deploy the missile systems.

One of the areas being examined by the HLG is the role of conventional weapons to complement the tactical nuclear forces. "The group is making a serious effort to upgrade the quality of conventional forces with more 'smart' weapons, both those currently available and those that may be developed as new technologies emerge and are exploited," Perle noted.

The HLG will present its third report this fall at a meeting of NATO defense ministers/secretaries. The one-day Sandia visit was part of the preparation for that report. It was the group's first opportunity to visit a DOE weapons lab and see the development work that underlies the group's research effort. "Members of the group are thoughtful — they can absorb information, such as that presented by Sandia, like a sponge," Perle pointed out. "And they were obviously impressed with the scope and quality of the work going on — as I knew they would be. They learned that a lot of thought has gone into the way the U.S. designs, handles, moves, stores, and protects nuclear weapons."

Wagner was also pleased with his group's two-and-a-half-day series of demonstrations and meetings at Sandia: "I view the visit as a real milestone, in a sense a watershed, because for the first time our allies were able to see the tremendous effort that goes into the safety and security features that the U.S. puts into the weapons themselves. They were also able to see the high standards and attention to detail that Sandia pays to the safety and security of nuclear weapons."

Given the positive reactions by heads and members of both groups, the satisfaction expressed by the heads of the Sandia organizations involved in Aprilfest is not surprising. Andy Lieber (5220) had primary responsibility for organizing the groups' visit. "Dozens of Sandians contributed to the success of Aprilfest," Andy said. "It was an exemplary performance by all of them, and I thank them sincerely."

"We met our objective — to show our visitors what Sandia is and what we're doing," said Bill Myre (5200). "That's important — most of our visitors get their information from reading. They seldom get a chance to see and touch the hardware they need to know about. We provided that opportunity."

"I think that Aprilfest has to be called a roaring success. And I want to credit Andy Liber, who orchestrated the whole visit, as well as all the other Sandians who worked on the event."

"I believe our visitors were thoroughly impressed with our technologies and applications of those technologies," Bob Peurifoy (7000) commented. "I suspect it will bring home to them the realities of what we've been stressing for years."

"Bill Myre and Andy Lieber deserve a great deal of credit for having run a very successful Aprilfest."

Orval Jones (5000) summarized the event: "The Aprilfest was a unique opportunity for us to exhibit our security and survivability concepts to key NATO representatives; in turn, it allowed them to visualize these concepts through actual hardware demonstrations. Based on the comments and compliments that I received during the visit, I believe we realized these objectives."

"Those Sandians, led by Andy Lieber, who organized and staged Aprilfest brought honor to us all. I thank them for a job well done."

Interview with Richard Perle

After last week's tour of Sandia by the two NATO groups, LAB NEWS interviewed Richard Perle, the Assistant Secretary of Defense for International Security Policy and chairman of the High Level Group of the Nuclear Planning Group, NATO. His comments provide a view of the national and NATO-level defense efforts we seldom hear firsthand.

The future for nuclear weapons in the defense of our allies in Europe was one subject Perle addressed: "Nuclear weapons have, and will continue to have," he said, "a critical role to play in the structure of the alliance deterrent, which will range from conventional weapons at one end of the spectrum to American strategic nuclear weapons at the other end. Theatre nuclear weapons are somewhere in the middle. In a sense the nuclear forces are irreplaceable."

"But I think it's also true that improved conventional munitions will enable us to assign to conventional forces some targets that are now assigned to nuclear forces because only the nuclear forces are capable of attacking and destroying those targets. That shift will at the very least have the effect of permitting a timely decision to escalate — if such a decision should ever be made — under relatively controlled circumstances, not in the midst of general retreat because we are being clobbered on the battlefield."

On the need for ongoing communication between the nation's negotiators and the scientists and engineers at the national labs, Perle noted the danger of international agreements that don't reflect technical realities, achievements, limitations: "There's a tendency to draft treaties that reflect today's technology in a way that may produce unintended consequences even just a few years later. For example, the ABM Treaty of 1972 rests on the concern that ABM systems based on radars and missiles might be deployed; it paid only passing attention to what are referred to in the treaty as 'other physical principles' that have dominated our thinking about ballistic missile defense. And while the ABM treaty is rather precise with respect to numbers of interceptors and numbers and locations of radars, it's very imprecise when it comes to directed energy weapons or lasers or kinetic energy devices and the whole range of things that are being looked at in connection with the SDI program. In that sense the treaty is dated. It did not capture in any sensible detail the evolution of technology. To some degree, of course, there were certain inherent limitations on the ability to foresee the evolution of technologies. But I also think the negotiations were not as assiduous as they might have been in searching out the direction technologies were headed."

On the question of whether the US should pursue the right to on-site inspections of Soviet installations (such as the radar under construction at Krasnoyarsk, which Soviet Ambassador Dobrynin is apparently suggesting for future inspection), Perle said, "Inspecting the radar would tell us nothing that we haven't already determined by looking at the physical structure. It's a typical Soviet propaganda ploy to make it

sound as though they are prepared to be accommodating on this radar when in fact nothing that we could learn by visiting the site would tell us anything about the capabilities of the radar that we can't assess by looking at size, orientation, and construction — which prove the radar is a clear and unambiguous violation of the ABM treaty, by the way."

"Now on-site inspection may be useful in some circumstances; in fact Sandia has done work on sensors — your national seismic stations, for example, and other sensor technology — where on-site inspections could be useful."

On the current debate over whether a comprehensive nuclear test ban treaty would in fact be destabilizing rather than stabilizing, Perle is firmly in the former camp. He summarizes the position of those who advocate a test ban: "The theory behind the stabilizing effect of the comprehensive test ban is that, in the absence of testing, confidence in the reliability and quality of our weapons will effectively decline. That lack of confidence would add to uncertainty about our force structure and presumably that of the Soviets as well. That uncertainty in turn would cloud the prospects for an effective first strike and therefore diminish the likelihood that one might be contemplated because the potential for carrying out a devastating first strike would be less certain and therefore less appealing. Well, it's not very appealing to begin with for the U.S."

But he rejects that approach: "What I think would happen under a comprehensive test ban is two things. First, both sides would work around the limitations much as they've worked around the limitations of the atmospheric test ban by finding ways of testing weapons underground. Second, in all likelihood the Soviets would cheat: they would conduct very low-yield tests that seismic evidence is simply not sufficient to reveal — and even if it were sufficient to reveal violations of the treaty, we would have little recourse. The Soviets are violating the present agreements. And not only is it difficult to respond to Soviet violations when the violations are clear, but when the evidence is ambiguous — as it inevitably would be if we had to rely on seismic phenomena that are always subject to dispute — then there is no doubt in my mind at all that we would be powerless to respond to those violations."

"So, far from making the world more stable, I think it would make it more dangerous. I think the Soviets would continue to develop their nuclear technology, and it is doubtful whether we would be able to keep pace with that. The Soviets have been pushing the comprehensive test ban partly because they know very well that it is not verifiable, and they benefit unilaterally from unverifiable agreements, as we have seen. The other part is that most of the rest of the world (the British excepted) think it's a great idea — because they don't understand it."

Perle also sees a debilitating effect of a comprehensive test ban on the ability of America's national labs, as opposed to the Soviet labs, to attract first-rate scientists



RICHARD PERLE

and engineers: "There is another asymmetrical advantage that the Soviets possess with respect to a test ban. That is, if they decide they are going to maintain national laboratories for nuclear tests, they can do it because they can instruct people as to where they will work. We can't do that. In an open society, people work where they choose to work, and maintaining the vigor of the laboratory system if no testing were permitted would be very difficult indeed. I think for certain purposes one could resort to surrogate testing, but for other purposes we would be in real difficulty. Simply testing the ability of weapons in the inventory to withstand nuclear attack would be prohibited. Some weapons effects can be simulated, but ultimately you have to have a test base that supports your simulation. So we would very quickly see a degradation in the quality in our analysis."

"So while the Soviets could maintain their laboratories by, in effect, consigning their scientific and technical community to work, the appeal for young American scientists and technicians to stay in the nuclear business if testing is prohibited would decline sharply, and then the quality of our ability to simulate would deteriorate."

"After all, it's people that are critical; to get talented people into this business, it has to be an intellectual and technical challenge. If you remove testing from the picture, you never know how good whatever you tried to build was."

"We just spent a day observing tests and listening to reports on tests. This is very much a test-oriented institution, and you see the pride when a test succeeds. That is, in many ways, the psychological payoff for months or years of effort. Remove that and it's like a play without a final act."

* * *

Richard Perle studied international relations both as an undergraduate and as a graduate student at the University of Southern California, at the London School of Economics, and at Princeton. His emphasis throughout was on defense issues and strategic policy questions. For many years, Perle also has been a Sandia consultant and considers himself "an old Sandia friend." Beginning in 1969, he worked for Senator "Scoop" Jackson and spent nearly 11 years on his staff, working with defense issues. While on Capitol Hill, Perle was involved in most of the legislation passed that dealt with national security concerns (including the readiness program). He has been Assistant Secretary of Defense since 1980.

Interview with Rich Wagner

Richard Wagner, a former associate director at Lawrence Livermore National Lab, is now Assistant to the Secretary of Defense for Atomic Energy and Chairman of Military Liaison Committee. He chairs the Senior Level Weapon Protection Group, a part of NATO's Nuclear Planning Group (see related story), that visited Sandia last week.

Wagner first described the origin and purpose of the SLWPG: "In 1982 I requested through the Secretary of Defense to the NATO authorities that a group be put together to look at the issues of weapon security and survivability. I felt it was essential to have a mechanism for working those issues in a more focused way than is done by the giant NATO bureaucracy. So that is what the SLWPG is charged with — providing analysis and insight and advocacy for matters related to security and survivability of the weapons in Europe. We usually meet somewhere in Europe three or four times a year and review initiatives being taken by the services, by the other nations, and by Sandia to improve security and survivability."

LAB NEWS asked Wagner about the SLWPG's relatively recent concern for nuclear weapon survivability (complementing its concerns with the security of weapons based with NATO forces in Europe): "Survivability is related to both safety and security — the measures you take to ensure that in peacetime you handle the weapons safely and maintain them in a secure way determine the way you have to operate with the weapons if you were to have to use them."

"In Europe, for reasons of safety and security, the weapons are stored in a rather small number of sites. Those sites have unique signatures — unique in the sense that those sites all look rather similar so they are well known to the Soviets. During a crisis, political considerations might require that those weapons be kept in those sites. That makes them tempting targets for the Soviets."

"At the same time, if you want to do things safely, you do them slowly and methodically and with a lot of people watching. But if you want, for instance, to move the weapons out of the sites so that it would be harder for the Soviets to attack them at the beginning phases of a conflict, you would want to do that rapidly, with as little attention as possible; that means few people around, and that's just antithetical to safety/security. So you have to manage them both together, or the measures you take for security and safety will overwhelm what you ought to be doing for survivability."

"It's a difficult task, and that's why the SLWPG is meeting here — Sandia has historically been right in the forefront of everything being done in safety and security. Now it's important for Sandia to be involved in survivability — you can't separate them. Sandia's role in survivability is absolutely crucial."

Reminded of the Forward Look study performed nearly 10 years ago by a Sandia team under Andy Lieber (5220), Wagner noted that progress has been slow in implementing the steps proposed in Forward

Look as necessary to ensure the survivability of weapons sited in Europe: "We haven't kept up with technology and with the Soviet threat." He also noted that two of his predecessors in his position were Sandians: Jack Howard and Don Cotter. "It was Don who suggested to me, when I first went to Washington from Livermore in 1982, that I should look into the progress made toward implementing the Forward Look proposals. Progress had been terribly slow. One reason is that to do anything in the NATO Alliance involves getting consensus from all the nations that have a nuclear role in the alliance — those to whom we provide weapons and who store weapons in their countries. Spending money requires essentially a consensus of all the nations. That is inevitably a cumbersome process so it takes a long time to get anything done."

Wagner saw the recent Sandia meeting as a major accomplishment: "I believe the Group members will carry away from this meeting a much improved view of how they may carry out their part in nuclear weapons security. After all, the security of nuclear weapons in Europe is a fully shared thing. In fact, in some ways it is the full, open sharing of the responsibility for the security of the weapons in Europe that allows the presence of those weapons to be a unifying, rather than a fragmenting, factor in the Alliance. If we acted as if the issue of the weapons in Europe were exclusively a U.S. responsibility, the sense of participation wouldn't be there. Participation by the allies in security is essential to the political role of those weapons in Europe. But in order for them to participate responsibly, they have to understand what standards we apply."

"I think they first came to that understanding at this meeting. It was a highly successful meeting — Sandia did a remarkable job of putting on demonstrations and of simply portraying its attitude and philosophy about how you have to take care of nuclear weapons. It was a superb two and a half days."

Asked about potential roles of the DOE weapons labs in developing advanced conventional munitions, Wagner replied: "As Richard Perle has said [see related story], it really is essential that we bring the benefits of American technology to conventional forces. The Department of Defense has rather cumbersome mechanisms for bringing conventional technology into the force structure. The way the DOE laboratories are managed and the general competence at the weapons labs really allow them to cut through the bureaucracy. So I think that if the nuclear labs aren't involved in some way, we will not improve the conventional munitions as rapidly as we should."

"The extent of the involvement is more difficult to predict. But it is clear to me — and I think to everybody in the Pentagon — that the involvement ought to be greater than it is today."

Wagner also suggested a role for the labs in developing means of protecting troops against chemical weapons: "One of my responsibilities is chemical warfare programs. I'm afraid those are rather 'betwixt



RICH WAGNER

and between.' Everybody understands the necessity for the nuclear deterrent, and everybody, I think, understands the necessity for not having to rely on that nuclear deterrent quite so much. That means upgrading the conventional forces."

"But a real flaw is this intermediate role of chemical deterrents. The Soviets have a tremendous investment in chemical weapons and in training for the use of chemical weapons. They have used them in Afghanistan, they have supplied them in Southeast Asia, so there just can't be any questions that chemical weapons play a central role in their arsenal. We have done essentially nothing for 16 years. We can't rely on protective posture — masks, suits, etc. — because even if you are protected from the chemicals you can't operate on a battlefield in the way that you ought to be able to do; so if we can't — as we cannot today — threaten the same kind of degradation of operational capability on the Soviets that comes with having to operate with protective equipment, then that gives them a tremendous leverage. Those degradations are on the order of 50 to 80 percent. So it is as if the number of divisions that NATO can mount in Europe were reduced by half if we have to operate in a protective posture and we cannot impose the same threat on the Soviets. It really is essential for us to do something to upgrade our chemical deterrent stockpile."

"It's an area the DOE labs have some role in also — not so much the offensive capability but in trying to improve our protective gear so that degradation is not as great. That's an often-overlooked, but terribly important, aspect of the labs' non-nuclear work."

Finally, LAB NEWS asked Wagner for his thoughts on the ongoing Blue Ribbon Panel study of the DOE/DoD interface: "I think that panel is approaching its work in a very responsible way. I'm convinced that they understand the special nature of the way the laboratories and the nuclear weapon complex are managed and will not upset that."

"I don't think there is any question but that the integrity of the GOCO [government-owned, contractor-operated] system, for example, will be maintained. But I'd prefer not to think of it as simply the GOCO system — the DoD has GOCOs. There are two special characteristics of the DOE labs that have to be preserved: one is

(Continued on Next Page)

Aprilfest: People, Places, and Protective Devices



WEAPON STORAGE IGLOO, with concertina wire and, later, smoke, is explained by John Kane (5211).



RICH WAGNER and Maggie Souleyret, Richard Perle's secretary, subject Sandia's sticky foam to thorough probe.



FORCE-ON-FORCE EXERCISE at the Small Force Engagement Experimentation (SFEE) facility.



TECHNICIAN moves weapon into storage vault developed by Sandia.

(Continued from Preceding Page)

the internal discretion of the management of the laboratories to put their effort and resources where they think they need to be and where the technology leads rather than where political imperatives might lead. That contributes to the effectiveness of the labs and also to the role that the laboratories have in providing the long-term continuity for the nation's nuclear weapons program. The labs must not be put in a situation where they are jerked around by the political winds in Washington.

"The other unique characteristic of the laboratories, I think, is that the labs do their work largely in-house as opposed to many of the DoD labs and DoD contractors, which

are characterized by a lot of subcontracting and a lot of geographic and managerial fragmentation. It is really essential to maintain that in-house capability. I'm convinced that the Blue Ribbon Panel is going to preserve those unique DOE characteristics. The panel members are really focusing on the DoD rather than on the interface between the two departments or on the internal DOE management. And in the DoD they are focusing on the way the Department develops "requirements" for nuclear weapon systems, particularly the requirements for nonstrategic, or tactical, systems. That issue is very difficult because of the complex relationship between the tactical nuclear deterrent and the

conventional forces. There's a wide range of opinions in Washington and elsewhere about how you ought to think about tactical forces. I think the original impetus of the Nunn-Warner initiative simply stemmed from this wide range of opinion about theater nuclear forces.

"At any rate, the Blue Ribbon Panel will likely focus on how the Pentagon develops requirements in that area. I think they can make some useful suggestions about how we develop the requirements. And I think that the panel may end up influencing the laboratories in the sense that, in the long run, DoD will ask for different kinds of things. But I don't think it is going to upset the major structure as it now exists."

Come Out to Fitness Day '85

There's something for everyone at the Fifth Annual Fitness Day on May 10, sponsored by Sandia's Friends of Health.

Dr. Jarrett Galbreth, sports medicine physician, will be the master of ceremonies. Dr. Galbreth has been called the "Albuquerque Sports Doctor" because of his daily KOB-AM radio show, "Here's to Your Health." He will discuss "Stretching."

Fitness events include a 1-1/2 mile walk/run/jog (not a race) or a 3-mile bike ride in addition to the stretching demonstration. Entertainment includes the Bob Banks Trio and the Sandia Mountain Cloggers. Pita pockets stuffed with turkey, sprouts, and avocado will be on sale for \$2 for the first 250 buyers; or bring your brown bag. Water will be available as well as free juice and fruit. All participants are eligible for a drawing for Friends of Health T-Shirts. Spouses, dependents, and retirees are welcome to participate.

Fitness Day will be held on the Parade Ground from 12 noon to 1 p.m. (management has approved an extra half-hour for lunch for participants and spectators — A-269 time). In case of rain on May 10, Fitness Day will be held May 17 (and the FOH committee will have 250 super sandwiches for sale on May 10).

Fun & Games

Biking — The New Mexico Chapter of the Multiple Sclerosis Society is sponsoring a two-day, 150-mile bike ride through the Jemez Country as part of its fund raising efforts. Scheduled May 18-19, the excursion takes Rt. 44 from Albuquerque to Hummingbird Music Camp north of Jemez Springs where participants will spend the night. They return the next day with an afternoon picnic stop planned at Coronado State Monument. Participants are asked for a \$150 donation (minimum) to the MS Society (which can be raised through sponsors). Meals, lodging, and refreshments are provided. Participants are also eligible for prizes ranging from a two-man pup tent to a three-piece luggage set. Grand prize is a Las Vegas trip for two. LAB NEWS (Bldg. 814) has entry forms.

* * *

Soccer — Sandia's summer soccer league games will begin the second week in June. The league emphasizes fun and recreation. Experience and skill are not required. Teams consist of both men and women, and games are played after work once a week. Sandia, DOE employees, contractors, and their adult dependents are eligible to participate. If you have a yearning to play soccer in an informal setting, get ready: you will receive a registration form in the May 1 SERP (Sandia Employee Recreation Program) newsletter.

* * *

Tennis — The Sandia Tennis Association announces a tournament May 18 and 19 for men and women's singles and mixed doubles to be played at the Coronado Club. Gift certificates go to winners in the three events. To enter, call Paul Longmire (5119) on 4-5455 before May 15.



S-T-R-E-T-C-H-I-N-G by Dr. Jarrett Galbreth will be the featured demonstration for Fitness Day 1985. Aerobic exercise was part of last year's Fitness Day program.

Medical Corner

High Blood Pressure Is the Silent Killer

by Susan Harris (3330)

A new drug for the treatment of high blood pressure is currently under study by one of Sandia's part-time physicians, and employees with the condition are invited to participate.

Why bother? Because high blood pressure, or hypertension, is the most significant risk factor for cardiovascular disease. It's also a major cause of heart failure, kidney failure, and stroke.

Even though high blood pressure contributes to the development of these disorders, it's often been neglected. That's probably because its cause is poorly understood; the treatment is lifelong and, at times, expensive; and, even when high blood pressure is severe, it's usually free of symptoms — until complications develop.

Fortunately, worldwide efforts aimed at hypertension detection and follow-up have begun to change the prevailing attitudes. Before 1970 only half of the 35 million Americans with high blood pressure were aware of their condition, and only a quarter of those were adequately treated. But a decade later three-quarters of the people with hypertension were diagnosed and were receiving adequate therapy.

We in Medical encourage you to have your blood pressure checked; remember, high blood pressure is the silent killer: you can have the disease without having any symptoms.

We also encourage those of you who are taking blood pressure medications to continue to take the medication as prescribed by your doctor.

Dr. Allen Adolphe, who works with us on

Wednesdays, is studying a new drug for use in high blood pressure treatment. If you have high blood pressure and you qualify for his study, you would receive a year's free medication and free medical care (related to your high blood pressure) in Dr. Adolphe's office.

To qualify, your diastolic blood pressure (the second, or lower, number) must be between 95 and 114; you must not have congestive heart failure or diabetes; and, if you're a woman, you must not be planning to have a baby during the year.

If you are interested and you qualify, call Dr. Adolphe's office, 296-5456.

'Starting Over' Again

by Arlene Price (3330)

Breaking up a relationship is a difficult process that involves making adjustments to a new way of life. Being able to meet with others who share similar problems helps us get through the rough times.

In an effort to help Sandians going through a divorce or loss of a loved one, Medical is offering its next Divorce Adjustment Class, "Starting Over." It provides an opportunity for Sandians to meet and discuss the issues that are a part of this experience.

The class will meet in Room 9 of T-13 Mondays and Wednesdays from 12 to 1 p.m. for 10 sessions, from May 6 through June 7. To enroll, please contact me at 6-0021.

Take Note

The Albuquerque Chapter of IEEE Computer Society will meet April 30 at 7:30 p.m. in Rm. 201 of the Electrical and Computer Engineering Bldg. on the UNM campus. Bob Trudo (2634) will discuss "Computer Communications." The meeting is open to the public.

* * *

Two young children killed in an auto accident on April 14 were the grandchildren of Frances (2122) and Bill (3424) Griego. The children's parents were both injured and their mother, Nester Romero (Frances' and Bill's daughter), died from her injuries April 19. Nester was an employee of Sandia contractor Kirk-Mayer and worked in Bldg. 870. Anyone wishing to contribute money to the family can contact Dennis Kramer (2122) on 4-2343.

* * *

Events Calendar

April 27-28 — Albuquerque Fiestas: multi-cultural event — play, music, entertainment, food, procession; commemorates the naming of NM by Onate. Begins noon on Sat., ends 6 p.m. Sun., Civic Plaza, 842-9003.

April 27, 30, May 4 — "La Gioconda," Albuquerque Opera Theatre, 8:15 p.m., KiMo, 243-0591/243-8492.

April 28 — Albuquerque Boys Choir, 4 p.m., KiMo, 242-1214.

April 28 — Audubon Society Wildlife Film, "Quebec Whales," 7:30 p.m., Popejoy.

Through May 5 — "That Championship Season," Fri. & Sat., 8 p.m., Sun., 6 p.m.; The Vortex Theatre, 2004 1/2 Central SE (1 block west of Yale Blvd.), 247-8600.

May 1 — Annual Feast Day at San Felipe Pueblo, corn dance with 500 dancers; contact pueblo.

May 1 — "San Juan Basin Paleontology," presented by Spence Lucas, UNM Geology Dept., and the Museum of Natural History, 7 p.m., KiMo, 841-8836.

May 3 — Ensemble Pro Musica presents Bach's "Cantata 147," Vivaldi's "Magnificat," and Handel's "Organ Concerto #1 in G Minor," 8:15 p.m., Our Lady of Assumption Church (Lomas & Tennessee).

May 3 — Santa Cruz Day at Cochiti and Taos Pueblos, green corn dance; contact pueblos.

May 4 — Up With People musical show, 7 p.m., Civic Auditorium, 831-7000.

May 5 — Cinco de Mayo Fiesta: Spanish dancers & music, Flamenco dancers, Break dancers, puppets, juggling, food, games, 12 noon - 10 p.m., parking lot South Broadway Cultural Center, 1025 Broadway, SE. 766-7712.

May 8-12 — NM Repertory Theatre, "Talley's Folly," a love story, 8 p.m., 2 p.m. matinee Sat. & Sun., KiMo, 243-4500.

May 9-10 — NM Symphony Orchestra concert, guest tenor Jon Garrison, guest conductor Raymond Leppard, and the NMSO chorus to perform Berlioz' "Te Deum" and Beethoven's "Symphony #3," 8:15 p.m., Popejoy.

Retiring this month and not shown in LAB NEWS photos are Baron Brumley (2363), Dolores Carlson (7200), Dick Illing (7261), Irv Lenz (7556), Henry Neues (7251), and Alice Rodriguez (2831).

* * *

The drivers of Sandia's over-the-road tractor-trailer rigs recently completed a 120-hour training course in tractor driving. The course, provided by Superior Training Services in Phoenix, led to Department of Transportation certification for each driver. Collectively, the drivers (all in Transportation Section 3423-1) pilot the rigs that carry instrumentation and other cargo all over the country — Florida, New York, the West Coast, and, of course, NTS and TTR. The graduates: Craig Walker, Alvin Yepa, Matt Bustos, Jose Gutierrez, Orlando Chavez, Larry Garcia, Larry Moya, Ralph Pena, Victor Gabaldon, George Gurule, Bobby Young, Robert Hill, Edward Canty, Jeffrey Myers, Paul Leonard, Nobert Baca, Bartolo Castillo, Martin Armijo, and section supervisor Jim Davis.



AUTHOR and Indian historian Joe Sando will be the next speaker at Sandia's Cultural Awareness Colloquium on April 30 at 10:30 a.m. in Bldg. 815 (outside the Tech Area). Sando, from Jemez Pueblo, will discuss ancient religious and cultural practices that are still practiced in the pueblos in New Mexico. Sando has lectured from New Zealand to West Germany. He taught Pueblo Indian history for eight years at UNM and has written three books, *The Pueblo Indians*, *Pueblo Indian Biographies*, and *Nee Hemish* (the history of Jemez Pueblo). Currently, he teaches at the Institute of American Indian Arts in Santa Fe. All employees are invited to the colloquium.



SANDIA'S FIRST VAX 8600 has arrived! The new computer, successor to the familiar VAX 11/780 and four times as powerful, is being delivered to Division 2825 to support the Product Test Data system. The 8600 will be clustered with the division's VAX 11/780 and will take over as the production machine. Project leader Cheryl Haaker procured the new VAX, which will be housed in T-28.

Professional Secretaries Week

Sandian Featured in Journal Coverage

Becky Hunter (1500) was one of three secretaries featured in a recent Albuquerque *Journal* article marking Professional Secretaries Week. The other two were retired secretaries who live at Vista Grande, the PSI (Professional Secretaries International) retirement center in Rio Rancho.

The article contrasted the memories of the retired career secretaries with those of a veteran of seven years. "When the *Journal* asked me for the name of a young secretary who had shown initiative in her career and was using all the modern methods of office management and equipment, I thought of Becky," says Sadie Knight (7540), publicity chairman for the Albuquerque chapter of PSI. "In her relatively short time at the Labs, Becky has advanced from division to director's secretary."

Professional Secretaries Week (once known as National Secretaries Week) was originated and is sponsored by PSI; it's always the last full week of April. Because of rate review, Sandia celebrates its own version of Secretaries Week in October.



BECKY HUNTER

RETI RING



Frank Garcia (7818), Art Eiffert (2850)



Marie Syme (3152)



Richard Corn (5264)



Mary Ellen England (3413)



Betty Brake (1513)



Ray Caster (5141)



Ken Williams (2442)



John Wichelns (3551), Frank Lesperance (7813), Luke Vortman (7111)

feed back

Q. The engineering and scientific professions have a high standard for integrity, especially concerning credit for work done. This credit is normally reflected in the order of the names of the authors of a report: the person who did the most work is listed first, and so on; the name of a person who helps in an indirect way is usually placed last in the list of authors as a courtesy. If all concerned did equal work, then the authors are listed alphabetically.

We Sandians often publish our results in journals, which are read by our peers. I cannot find a firmly established Sandia policy on the listing of authors of Sandia reports and articles. Is the above policy applied at Sandia?

A. I am unaware of an official Sandia policy, in the sense of an SLI, that governs authorship of publications. However, Sandia's Code of Conduct requires us to be honest, fair and responsible in our work and in dealing with each other. The guidelines you outline are common practice among the professional, scientific, and engineering communities and, as such, are appropriate to Sandia. Of course, there may be disagreement among authors as to the importance of their relative contributions, and hence order of authorship, or whether a contribution is sufficient to warrant authorship. My experience is that the principals usually work this out among themselves. If agreement cannot be reached, then I suggest supervision be asked to judge what is fair.

O.E. Jones - 5000



Here are some spring projects for Volunteers for the Outdoors. If you would like more information, call Karen Shane (4-3268).

GRANDE GORGE TRAIL CREW TRAINING SESSION, May 4. On-site training (including trail maintenance and crew leader techniques) will be offered at La Junta Trail (north of Taos).

CORONADO PARK ADOBE PROJECT, May 5, 2-4 p.m. Volunteers will mud an existing wall to prevent further erosion. Good project for children.

RIO GRANDE GORGE TRAIL PROJECT, May 18-June 2. Crews will build trail tread and construct erosion control structures and masonry retaining walls. You may join the crew for a weekend, a week, or the entire time. A river rafting trip will be offered on June 3-4 for members.

Congratulations

June Rugh (3543) and Roy Aydelotte married March 29 in Placitas.

Mat (1522) and Mary (1623) Sagartz, a daughter, Laurel, April 1.

Bill (7475) and Kathy Morgan, a son, David, April 1.

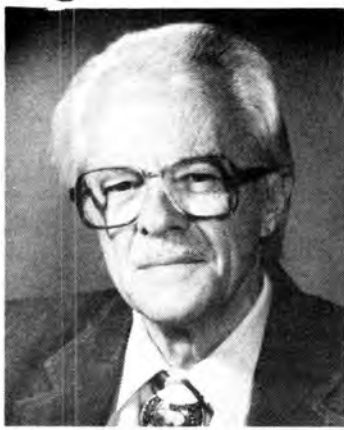
MILEPOSTS

LAB NEWS

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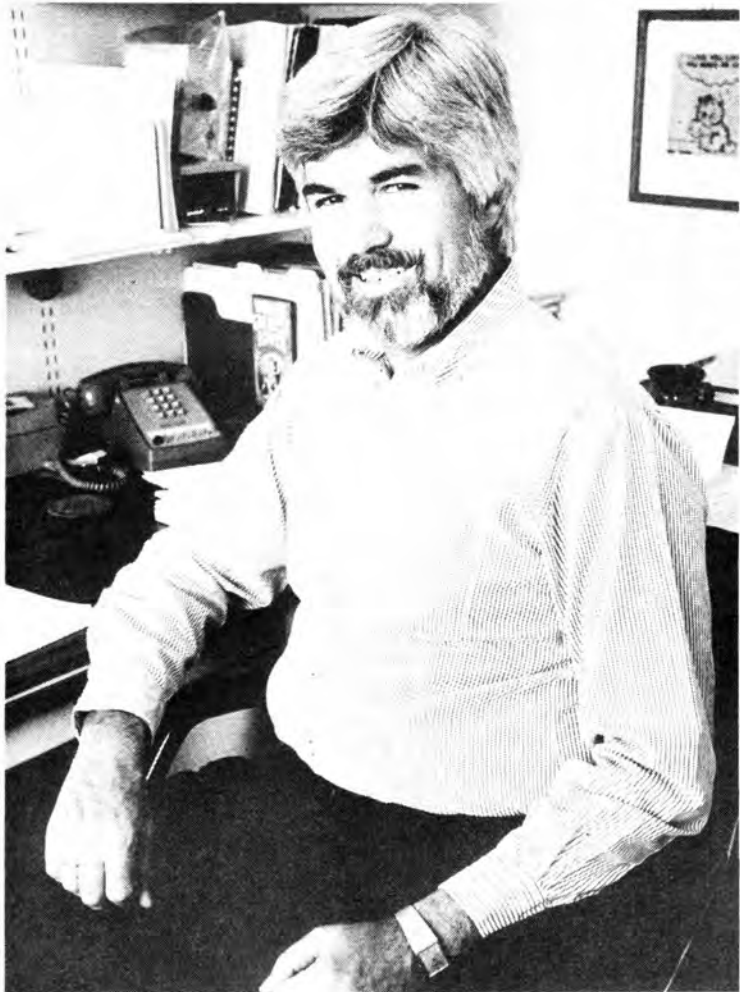
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Lee Garner (3151) 20



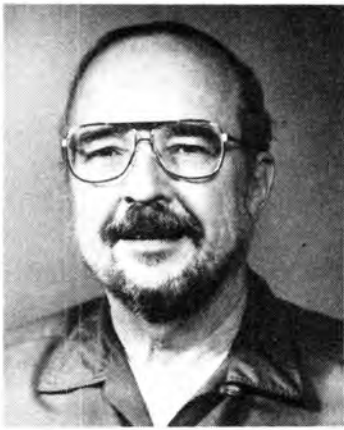
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Gary Jones (6223) 15



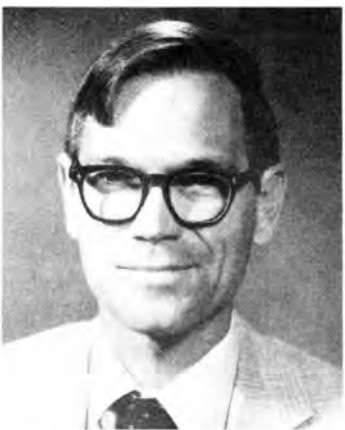
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Allen Asselmeier (2157) 25



Clyde Seibel (8442) 15



Bill Dawes (2120) 10



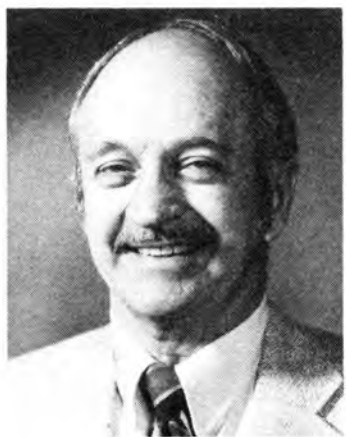
Leonard Flesner (5113) 30



Bob May (8254) 25



Jim Clark (7171) 25



Bob Leslie (7265) 30



Dick Corn (5264) 25



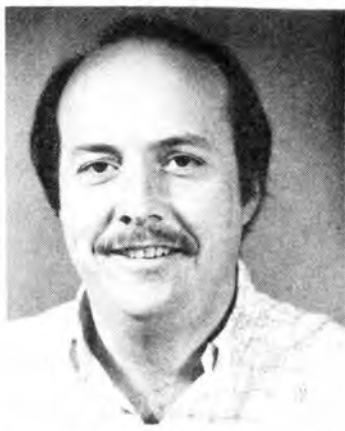
Jesse Allen (5252) 25



Bill Roper (7173) 30



Jack Gallagher (2545) 25



Steven Pink (5121) 10

Sympathy

To Carleton Palmer (3551) on the death of his father in Mescalero, March 22, and the death of his father-in-law in Mescalero, March 30.

To Kenneth Datz (7173) on the recent death of his mother in Pennsylvania.

To Phil Gallegos (7474) on the death of his brother-in-law in Denver, April 10.

To Sal Baldonado (7474) on the death of his father in Gallup, April 10.

To Eloy Barela (7474) on the death of his mother in Albuquerque, April 15.

To Frances (2122) and Bill (3424) Griego on the deaths of their daughter, April 19, and two grandchildren, April 14, in Albuquerque.

Death

Tom Harrison of Photovoltaic Technology Evaluation Division 6221 died April 21 after a long illness. He was 63.

He had worked at the Labs since April 1954.

Survivors include his wife, two sons, and two daughters.



UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

Deadline: Friday noon before week of publication unless changed by holiday. Mail to: Div. 3162.

Ad Rules

1. Limit 20 words, including last name and home phone.
2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8 1/2 by 11-inch paper.
5. Use separate sheet for each ad category.
6. Type or print ads legibly; use only accepted abbreviations.
7. One ad per issue per category.
8. No more than two insertions of same ad.
9. No "For Rent" ads except for employees on temporary assignments.
10. No commercial ads.
11. For active and retired Sandians and DOE employees only.
12. Housing listed for sale is available for occupancy without regard to race, creed, color, or national origin.

MISCELLANEOUS

AIR compressor, Craftsman, \$250; hydraulic press, 10-ton, \$150. Murata, 881-8459.

SLEEPING bags, new, never used, one Appalachian 3-lb. dacron, \$28; one Coleman 4-lb. insul-200, \$35. Rainhart, 821-3690.

SCOPE, Tasco 30-90x60 zoom on tripod, \$90 cash. Buza, 298-1531.

B-B-Q, Weber 22" kettle w/accessory racks & elec. starter, \$30. Horton, 883-7504.

HOOVER Advantage canister vacuum cleaner w/Power-Mate, less than 6 mos. old, \$175. Colgan, 344-3776.

SEARS modular home gym: slant board, incline back, dbl. leg. lift, squat rack, weights & barbell, \$130 OBO. Ortiz, 869-3278.

RIMS & tires for '77 Chevy pickup, 5-hole, Silverado deluxe rims, radial tires, LR78-15, set of four, \$125, \$35 each. Shunny, 265-1620.

QUEEN size mattress, box spring, frame, \$150; twin mattress, box spring, frame, \$45. Navratil, 293-5527.

10" TABLE saw, Sears Craftsman, 2 yrs. old, \$300. Gonzales, 842-9604.

REDWOOD 1200-egg incubator, \$400; 16' garage door, single metal panel, \$50; will trade. Lackey, 898-6638.

WYSE WY-75 computer terminal, emulates VT-100, VT-200, VT-52, list price, \$795, 8 mos. old, \$495. Riley, 292-0163.

DOG house for med.-size dog, sturdy, almost new, \$35. Buck, 296-2890.

GOLF cart, Cushman elec., charger, canopy, lights, trailer ball, \$275; 50s Coke machine, \$180. Harwell, 265-4906.

HOTPOINT gas dryer, top of the line, white, \$250. Staley, 293-5237.

OAK chair, \$35; rocking chair, \$45; oak chair w/writing arm, \$25; brass-plated floor lamp, \$35. Troncoso, 897-1167.

SEWING cabinet, pecan, needs refin-

ishing; dinette chairs, 6 vinyl, worn. Kramer, 262-1040.

SUPER trampoline w/7' x 14' nap, 1/2 price; '78 Holiday Rambler travel trailer, self-contained, \$3800. Thompson, 884-7712.

BANJO, 5-string Kay brand, 10 yrs. old, \$70; adult tricycle, \$80. Mabery, 898-4125.

25" COLOR TV, Curtis Mathes, 5 yrs. old, \$300. Tapia, 294-4139.

FENDER Bullet guitar, 1 yr. old, 2 pickups, 1 vol. & 1 tone control, \$245. Tennyson, 292-5844.

ROCKWELL 10" table saw, \$250; propane-oxygen welding set, \$40; arc welding set, \$25; tankless compressor, \$60; assorted small tools. Ezell, 821-1768.

CAMERA outfit: Pentax-MG, 50mm lens, 135mm lens, flash, gadget bag, never used, \$50; bicycles, girls 16" w/training wheels, Strawberry Shortcake, \$25; Honeywell room burglar alarm, new, \$30. Mauldin, 265-5650.

TRAVEL trailer, 25' Midas, equipped as 2nd home for long-term living, low road mileage. Guerin, 867-3015.

LOUVERS for '74 (or similar) Camaro, black alum., \$20. Holmes, 292-0898.

DIAMOND solitaire, .45 ct. marquise cut, AGS grade F-G color and SI-2 in clarity, gold band w/platinum head, certified appraisal \$1430, sell for \$950 OBO. Swahan, 831-1579.

TWO microfloppies w/S100 controller, \$125; Teletype, \$60; EML 101 music synthesizer, \$600; new HK91, \$500; 45 brass, \$50/thou. Hubbard, 842-9431.

STEREO system: couch & chair; rocker; color TV; dinette set; many more items. Kurtz, 294-7646.

CARPET cleaner, Sears power steam spray model w/upholstery nozzle, \$75; 4 golf bag carts. Kaiser, 296-5215.

6' SOFA & loveseat, \$150. Johnson, 836-3164.

FREE to good home, gentle, 4-yr.-old male Collie. Barsis, 293-5347, 298-4741.

TIRES & rims, 4 ea., P235/75R15M/5 SB radials mounted on 4 Chevy 6-hole truck rims, tires under warranty, \$220. Snelling, 294-5751.

CAMERA, Canon AE-1, 1.8 lens, auto. exposure, etc., \$125. Chavez, 298-0674.

HELMET, Bell R/T size 7 1/8, \$15; French para-boots, size 9 1/2, \$15. Russell, 298-0162.

FREEZER, 21 cu. ft. frostless Signature, avocado green, \$225. Edwards, 822-1772.

COZY coupe, \$30; Wonder horse, \$30. Lyo, 299-6470.

FOLDING ping-pong table, Rallye Supreme, reg. size, w/net, paddles, & balls, \$59. Paul, 299-6387.

WOODSTOVE heater, small, \$50 OBO. Vigil, 869-6870.

WEDDING gown, purchased at Nancy Hamilton's, Murray Hamburger of New York design, champagne lace, size 7-8, \$300. Laird, 293-7696.

RCA color TV, '72 25" console, \$150 OBO, 3 ea. 14" VW wheels w/radials, free. Phelan, 888-4193.

TIRES, 2 ea. E78-14, mounted & balanced on Datsun pickup wheels, \$40. Unkelhaeuser, 281-5624.

KING box springs, \$50; brass lamps, \$15, Datsun 4 x 4 wheels, set of 4 for \$75. Miller, 281-3655.

WEIGHT bench w/leg lift, 5-position tilt back, never assembled, new cost

\$80, sell \$65. Schkade, 292-5126.

CAR SEAT, \$10; stroller, \$20; bicycle trailer, \$30; 10-spd., \$25; river raft, \$25; swag lamps, \$10. Jarrell, 293-9671.

SOFA, sleeper, full size, \$100; 13" viola or 3/4 violin, \$200; boys or girls 20" bicycle, \$60. Widman, 293-7279.

QUESTAR 700mm lens, T mount w/Nikon adapter, converts to telescope, \$950 (half list). Huntington, 836-4109.

AMANA freezer, \$375; slate pool table, \$550; medicine cabinet, toilet & sink, \$15 ea.; ladies bowling ball/bag, \$25. Adams, 881-6836.

FREEZER, Signature 11 cu. ft., upright, white, \$125. Fuentes, 268-8239.

COUCH w/matching chair, coffee table, all \$250. Sanchez, 292-7904.

AKAI GX 230D tape deck, \$350; older 19" port. color TV, \$45; Dunlop K291T Touring Elite, MP90H18, new, \$50. Kovacic, 281-1754.

COCKTAIL table, gold leaf/marble, \$300. Turpin, 299-7580 after 5.

CONCRETE mixer, \$150; yellow vinyl loveseat, \$30; bolster day-bed set (2 beds w/storage & corner table), \$200. Claghorn, 884-4483.

SAILBOARD, Obrien 12' PE planing hull, retractable dag, vario-boom, mast ext 65 sq. ft. Neil Pryde mylar fathead, Avalanche beacons (2), Ramer Echo II. Ritchey, 268-7620.

ROTARY tiller, 4HP, \$75. Tilgner, 294-6464.

TOYS; ski boots, skis; lamps; occasional tables; snow tires; misc. items, garage sale, April 27, 9-4, 2616 Georgene NE. Drothing, Rovang.

CHANDELIER, brass & wood w/3 chimneys, 16" diameter, takes reg. light bulbs, retails, \$125, sell \$25. Burstein, 821-6688.

POLICE scanner, Pro-7B 8 channels, Radio Shack brand, 120V, AC & 12V DC operation, \$60. Gendreau, 268-3436.

COUCH, gold color, \$125; matching chair & ottoman, \$100; recliner chair, \$75. Falacy, 293-2517.

CAMPER, pop-up tent trailer, '79 Bethany, 940 lbs., sleeps 5, sink, 2-burner stove, icebox, furnace, \$1400. Knoll, 299-1181.

EVAPORATIVE cooler, 2-spd., down-draft, \$125. Sons, 294-3953.

DINING TABLE, butcher block style, 6-sided, w/chairs, \$400; sewing machine & cabinet, \$50. Westrich, 293-9671.

16' TRAVEL trailer, '75 Cardinal, new battery & tires, many extras. Stoever, 296-3717.

COUCH & matching chair, 84" long, high back, rust plaid, Citation by Kroehler, \$350. Hernandez, 268-5000.

BIKE, girls 26" 10-spd., \$30; bar bells, weight bench, \$60; stereo tuner & amplifier, \$50. Garcia, 293-3937.

TRANSPORTATION

'83 PLYMOUTH Colt, 4-dr., twin stick, AM/FM cassette, 35 mpg. Reeder, 299-3863.

'70 CHEVY Kingswood str. wgn., 350 engine, PS, PB, AC, AT, \$650. Gendreau, 268-3436.

BOAT & OB motor, 12' Sears Gamefisher, 6HP Johnson, boat cover & oars, boat \$350, motor \$550, both \$850. '74 Camaro, white, AT, AM/FM/CST, new tires, starter & rebuilt carb. 117K miles, \$2250,

Holmes, 292-0898.

'80 KAWASAKI KZ440, windshield, luggage rack, new rear tire & battery, 11K miles. Heifetz, 881-4613.

FORD SW, \$1200 OBO. Altwies, 292-3884.

'79 HONDA CVCC HB, AC, AM/FM, 5-spd., 65K miles, overhauled AT, 51K, \$2795. Heaphy, 293-0417 after 5.

'79 YAMAHA XS650 Special, 6K miles, full fairing, AM/FM, \$900 OBO or will trade. Marquez, 836-7115 after 5.

'79 PLYMOUTH Sapparo, \$500 & take-over or \$3500. Serrano, 822-8742.

BIKE, Nishiki Olympic 12 10-spd., 21" frame, 268-0774 after 6.

'67 VOLKS motor, trans., wheel, body bad, make offer, 8 1/2' cabover camper, Navalese, 344-0598.

'77 CHEVY Vega, \$1000. Turrietta, 864-9271.

'80 TOYOTA Celica GT, brown, cloth interior, PS, AM/FM, cass., sun roof, tilt, new tires, 49K miles, \$5195. DiMarzio, 881-9231.

'81 PEUGEOT 505S turbo diesel, loaded, AT, custom paint & wheels, \$6800. Beeler, 822-9485.

'68 PLYMOUTH Fury II, \$600 or consider your offer. Lane, 884-4566.

'78 YAMAHA 650, \$750 OBO. Brosseau, 294-4731.

MYATA MT. bicycle, 7 mos. old, \$400; girls Huffy single spd. bicycle, \$25. Gronseth, 299-3540.

'81 RELIANT str. wgn., 4-spd., one owner, \$3500. Moore, 296-6586.

'75 JEEP Wagoneer, AC, PS, PB, CB hookup, new radials, luggage rack, 69K miles, \$2600. Blewes, 268-9019.

'72 KAWASAKI H2, 750cc triple, new paint, chain, sprockets, fork seats, \$425; wet suit, O'Neill 2mm Farmer John, fits 5'8"-5'11", 145-165 lbs., \$50. Healer, 298-6967.

'82 FORD F150, AT, AC, PS, radio, aux. fuel tank, LWB, asking Blue book. Rogers, 298-7907.

'80 MAZDA GLC wgn., 85.7K miles, 5-spd., Esprint radials, AM/FM stereo, luggage rack, \$2200 OBO. Kurtz, 294-7646.

CHEVY 350 motor. Chavez, 867-2213.

'76 HONDA 750-F mod., \$800 or trade. Johnson, 836-3164.

'79 CHEVY Chevette, 4-dr. HB, AT, 4-cyl., AC, \$2000. Montano, 294-4238.

'66 THUNDERBIRD, white w/white interior, \$4300 OBO. Hymes, 292-5355.

'78 VW Rabbit, 4-dr., low miles, newly painted, \$2500. Gallegos, 268-6416, 243-0100.

'79 CHEVETTE, AT, AC, \$400 below book at \$1650. Vigil, 869-6870.

'81 TURBO Trans Am, fully loaded, 35K miles, \$8750. Laird, 293-7696.

'74 SUBARU 1400 DL, 2-dr. sedan, recently overhauled engine, new paint & radials, stereo radio/tape deck, Caton, 294-4490.

'82 S15 GMC truck, V6, PS, PB, 4-spd., camper shell, 28K miles, AM-FM cassette radio. Witkowski, 299-6402.

'72 CHEVY pickup, new engine, recent trans., HD everything, \$2000. '79 Chev, 3/4 ton deluxe LWB w/tool box, HD everything, \$3000. Lucero, 294-0866.

'66 BUG, 6K miles on completely overhauled engine, \$875 OBO. Stuart, 265-7315.

'76 AUDI 100LS, fuel injected, 4-spd. manual, 4-dr., cassette stereo, \$1500. Pappas, 881-3440.

'72 DATSUN pickup, 1600cc, 4-spd., \$650 OBO. Thorn, 892-7944.

VOLKSWAGEN pop-top camper, rebuilt engine, 25 mpg. Davis, 298-1957.

'64 VOLKSWAGEN bug, '68 Chrysler Newport, white, both one-owner, \$1000 each. Claghorn, 884-4483.

'72 FORD Maverick, 4-dr., 75K miles, radials, AM radio, AC, 1 owner, \$900. Ratzel, 821-6368 after 6.

'72 BUICK Skylark, \$1500 OBO, Sears refrig., \$150; full size mattress, \$50. Searls, 268-2946.

'77 DODGE van, AT, AC, PS, 4 captains chairs, chrome wheels. Gallegos, 293-2408.

'80 KAWASAKI street or trail bike, KE175 model, 2 cycle, less than 500 miles, \$595. Norwood, 292-0072.

'77 VW Rabbit, 4-dr., 30 mpg city, \$1095 OBO. Garcia, 293-3937.

'84 BMW 318i, white, 21K miles, sunroof, AC, AM/FM cassette, \$14,500. Gunter, 266-9242.

'83 CHEVETTE Scooter, 4-spd., 18K miles, NADA retail \$3525, sell \$3025. Weber, 293-7522 after 4:30.

'79 OLDS Delta 88 Royale coupe, AC, tilt, CC, power, AM/FM cassette, make offer. Randall, 299-3935.

'83 MERCURY Capri RS, 5.0 litre engine, 5-spd., 7K miles, T-top, AC, plus most options, \$8000. Crane, 281-9292.

REAL ESTATE

MH, 12 x 50', Taos, \$6350; military active or retired, no down; assume payments of \$125/mo. Lopez, 265-3296.

MOUNTAIN Home, South 14, 1200 sq. ft., excellent water, 2+ bdrs., custom kitchen, barn, fp, woodburning stove, \$65K, VA, FHA or REC. Evans, 281-3864.

ROBERSON 3-4 bdr., 3 bath, remodeled kitchen, yard w/fruit trees, 3308 Aztec Ct. NE. Gronewald, 883-7714.

SE, 2+ bdrs., 1 bath, lg. backyard, oak floors, flexible terms, \$49K. Hubbard, 842-9431.

MH, '73 Bonavilla, dbl. 24 x 50, set up at Aztec MHP, 3000 Aztec NE, in 20s. Chavez, 298-0674.

VIEW of Manzanos from Tome Shadows, exclusive residential subdivision, 3/4 acre, underground utilities, terms, \$15,500. Vigil, 869-6870.

3-BDR., 2 bath, all updated, near Base, schools, hospitals, Ridgcrest area, SW landscape, \$95K. Mauldin, 265-5650.

CUSTOM house, views, hw floors, triple glazed wood windows, insulation upgraded. Gallegos, 293-2408.

MH w/awning, '83 Lancer, 14 x 72, 2-bdr., 2 bath, pitched roof, fenced yard, set up in Shaw, Aydelotte, 867-4143.

WANTED

ATARI 850 interface to allow interface & use of non-Atari printer. Reeder, 299-3863.

WEIGHTS and/or bench, steel or cast iron only. Behe, 293-0140.

JAPANESE Samurai swords & daggers in any condition. Coffman, 821-6706 after 6.

WHEEL or tire & wheel for '83 Ford Escort. Hall, 298-8617.

Poor Boys Play Tonight

TONIGHT, the Isleta Poor Boys, one of the more popular country and western bands in the city, return to the Club to play from 8 to midnight. The dining room features your choice of prime rib or snow crab, two dinners for the price of one at \$12.95. Dining room hours are from 6 to 9 p.m.

* * *

TOMORROW, the Thunderbirds, retiree group, dance to Big Band Sounds at the group's Spring Dinner Dance. Cocktail hour starts at 5, the buffet at 6. Tickets are \$7. Call the Club office, 265-6791, right now about reservations.

Other Thunderbird activities include: Card sessions at 10:30 a.m. on May 1, 13, and 28; the RV group plans a junket May 21-22 at Manzano Park on South 14 (call Bob Schmedeman, 299-2077); the board of directors meets May 6 at 2 p.m.; Pat Liguori is looking for a group of opera lovers to see video presentations on the Club's big TV screen (call Pat on 256-3613 or 255-7551); and the singles group could use a new volunteer leader — the last two got married.

Any Sandia or DOE retiree is invited to join the Thunderbirds — applications are at the Club office.

* * *

NEXT FRIDAY, the merry month of May starts out with Western Flyer on the bandstand, a two-for-one special in the dining room (your choice of filet mignon or deep fried shrimp for \$12.95), and free western dance lessons from 7:30 until 8:30. Call 265-6791 for reservations.

* * *

ON SATURDAY, May 4, Family Night features a full-length Walt Disney animated classic, *Robin Hood*, preceded by a short cartoon, *Mickey's Birthday*. Food service starts at five; the entertainment at six. There is no admission charge for members and families.

* * *

ALSO ON MAY 4, registration is scheduled at 9 a.m. for the summer's swim classes. The Club office has schedules.

* * *

A TRAVEL PROGRAM on the Far East will be presented by Gemini Travels on Monday, May 6, at 7:30 p.m. in the El Dorado room. Singapore, Hong Kong, and Tokyo will be among destinations discussed.

Literature is available at the Club office on upcoming trips: Las Vegas, May 26-29, \$110; Disneyland, June 23-25, \$202; Colorado, June 29-July 6, \$299; and Canyon De Chelly, Oct. 20-21, \$90.

* * *

THE CLUB'S MAY CALENDAR has several events worth making early plans for — an elegant Mother's Day brunch on May 12; an open house on the patio on Friday, May 17; a travel program about the British Isles on May 20; and an all-day grand opening party for the pool and patio area on Memorial Day, May 27.



CONTRACTOR CREWS are busy in the Club's pool and patio areas renovating the twin pools and resurfacing the tennis courts. A general spruce-up of the area (which has been called the most attractive private club facility in the city) is underway. The pool opens for members at 4 p.m. on Friday, May 24 (the last day of school), and the patio will be open that evening for Friday night dining. Regular hours start the following day with the pools open from 11 a.m. to 6 p.m. An open house (an enticement for new members) is scheduled Friday, May 17, from 4 to 7 p.m. The all-day Memorial Day grand opening party is scheduled Monday, May 27.

Southwest Fighting Grand Champion

Lamb Becomes Karate Lion

Six bouts, one right after the other, make for a long day. But when it was over, Eric Lamb (3426) emerged the Southwest Fighting Grand Champion in the recent karate regional tournament held in Albuquerque.

At 145 pounds, Eric entered the black belt lightweight division, defeated four opponents in a row, then took on the winners of the medium and heavyweight black belt divisions. The last match, against the heavyweight — a man called "Mad Mac" who is a professional boxer and the winner of the recent "Tough Man Contest" — was a grueling ordeal.

"He hit hard," Eric says. "The idea of the tournament was to score points, not knockouts. But karate is a fast-moving sport, uses a lot of fancy technique, and people occasionally get hurt."

Eric has been involved in karate since he was a youngster taking a class on KAFB. His father (Ray Lamb of Tech Art Division 3155) and his uncle showed him some early moves. The military family moved to Germany, and Eric continued the karate classes — progressing up the hierarchy of blue belt, brown belt, etc., and studying with some outstanding teachers.

Back in the states, Eric earned his black belt in Ft. Worth, studying under a former world champ. When the family moved to Albuquerque, Eric opened his own school, the Modern American Karate Academy, and operated it until he joined Sandia 18 months ago.

Now he gives private lessons, maintains a heavy personal workout schedule (about three hours of stretching and weightlifting four times a week), and takes out-of-hours educational courses. He plans to enroll at T-VI next September and pursue a TI certificate in electromechanical drafting.



ERIC LAMB (3426) strikes an appropriate pose for the Southwest Fighting Grand Champion. The trophies were awarded recently at the close of a regional karate tournament: the small one for the championship in the lightweight division, and the big one (six feet) for defeating the black belt champions in both medium and heavyweight divisions.